

CLAIMS

1. An apparatus (21) for assembling a collapsible enclosure assembly (1) onto a container (11), the enclosure assembly (1) being of the type comprising a plurality of collapsible walls (2, 3, 4) and which is
5 adapted to be supported, when erected, on the container (11) so that in situ the enclosure assembly (1) encloses a region above the container (11), the apparatus (21) comprising means to move a collapsed enclosure assembly (1) from a storage position (25) to an assembly position (36), means to move the walls (2, 3, 4) of the collapsed enclosure assembly (1) when in the assembly position (36) relatively apart to expand the enclosure assembly (1) so as to be of generally tubular form, and means to mount the expanded enclosure assembly (1) on a corresponding container (11).
2. The apparatus (21) of claim 1 wherein the apparatus (21) is adapted
15 to assemble collapsible enclosure assemblies (1) of the type comprising a first two opposed walls (2, 3) and a second two opposed walls (4), the enclosure assembly (1), when expanded, being of quadrilateral cross section.
3. The apparatus (21) of claim 1 or claim 2 further comprising storage
20 means (25) for storing at least one collapsed enclosure assembly (1).
4. The apparatus (21) of claim 3 wherein the storage means comprises a chute (25), the enclosure assembly (1) being located between parallel side walls of the chute (25) in a substantially upright condition with the enclosure assembly (1) being adjacent to an end wall (27) of the
25 chute (25).

5. The apparatus (21) of claim 4 wherein the chute (25) is inclined with the end wall (27) being lowermost.
6. The apparatus (21) of claim 4 or claim 5 wherein the base of the chute (25) is provided with conveyor means (29, 31) to convey a
5 collapsed enclosure assembly (1) towards the end wall (27) of the chute (25).
7. The apparatus (21) of any one of claims 4 to 6 wherein the end wall (27) is spaced from the end margins of the side walls of the chute (25) by a distance greater than the thickness of the enclosure
10 assembly (1) when in the collapsed condition.
8. The apparatus (21) of claim 6, or claim 7 as dependent on claim 6, wherein the conveyor means (29, 31) is of walking beam type comprising two parallel beams (31) that sequentially move upwardly, forwardly and then downwardly to sequentially lift the enclosure assembly (1), move the
15 enclosure assembly (1) towards the end wall (27) of the chute (25) and to lower the enclosure assembly (1).
9. The apparatus (21) of any one of claims 4 to 8 wherein the chute (25) stores multiple collapsed enclosure assemblies (1) in a substantially horizontal row.
20 10. The apparatus (21) of any one of the preceding claims wherein the means to move the collapsed enclosure assembly (1) from the storage position (25) to the assembly position (36) comprises a first planar element (41) that is movable between the storage position (25) and the assembly position (36) and against which the collapsed enclosure
25 assembly (1) can rest, and retaining means (47) to grab a collapsed

enclosure assembly (1) from the storage position (25) and to retain the enclosure assembly (1) on the first planar element (41).

11. The apparatus (21) of claim 10 wherein the retaining means (47) grabs and retains a first wall of the enclosure assembly (1).

5 12. The apparatus (21) of claim 10 or claim 11 wherein the first planar element (41) is mounted on a carriage (37) that is movable along a guide rail (35) on the apparatus (21).

13. The apparatus (21) of claim 12 wherein the guide rail (35) is located substantially perpendicularly to the longitudinal axis of the chute (25).

10 14. The apparatus (21) of any one of the preceding claims wherein the means to move the walls (2, 3, 4) of the enclosure assembly (1) relatively apart comprises means to pull an opposed wall away from the first wall of the enclosure assembly (1).

15 15. The apparatus 21 of any one of claims 1 to 13 wherein the means to move the walls 2, 3, 4 apart comprises means to push an opposed wall away from the first wall of the enclosure assembly 1.

16. The apparatus (21) of claim 14 wherein the means to pull the opposed wall comprises a second planar element (51) against which the opposed wall of the collapsed enclosure assembly (1) can rest, and
20 retaining means (47) associated with the planar element (51) to grab the opposed wall of the collapsed enclosure assembly 1 to retain the enclosure assembly (1) on the planar element (51).

17. The apparatus (21) of claim 16 wherein the second planar element (51) of the means to move the walls of the enclosure

assembly (1) relatively apart is movable between a position adjacent the first planar element (41) in which the second planar element (51) grabs and retains the opposed wall of the enclosure assembly (1) and, when so retained, a position distal from the first planar element (41), the
5 movement from the position adjacent the first planar element (41) to the position distal the first planar element (41) pulling the opposed wall of the enclosure assembly (1) away from the first wall of the enclosure assembly (1) to expand the enclosure assembly (1).

18. The apparatus (21) of claim 17 wherein each planar
10 element (41, 51) comprises a plate.

19. The apparatus (21) of any one of claims 10 to 13, or claims 14 to 18 as dependent on any one of claims 10 to 13, wherein the retaining means comprises a finger (47) that is movable between a first orientation and a second orientation, the finger (47) being received in part of the
15 respective wall (2, 3, 4) of the enclosure assembly (1) when in a first orientation, movement of the finger (47) to the second orientation retaining the respective wall (2, 3, 4) of the enclosure assembly (1) on the respective planar element (41,51).

20. The apparatus (21) of claim 19 wherein said part of the enclosure
20 assembly (1) comprises an aperture, the finger (47) being adapted to extend through the aperture when in the first orientation but not being removable through the aperture when in the second orientation.

21. The apparatus (21) of claim 19 wherein the finger is rotatable between the first and second orientation.

22. The apparatus (21) of claim 21 wherein the rotatable finger (47) is mounted on a shaft (45) that is operative to extend the finger (47) through the aperture and rotate the finger (47) to the second orientation.
23. The apparatus (21) of claim 22 wherein the finger (47) extends substantially perpendicularly from the longitudinal axis of the shaft (45).
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24. The apparatus (21) of any one of claims 19 to 23 wherein the retaining means on each planar element (41, 51) comprises two fingers (47).
25. The apparatus (21) of any one of claims 10 to 13 or claims 14 to 18
10 as dependent on any one of claims 10 to 13 wherein the retaining means on each planar element (41, 51) comprises a suction cup adapted to suck onto a wall of the enclosure assembly (1) using a vacuum.
26. The apparatus (21) of claim 25 wherein each suction cup is connected to a vacuum source.
- 15 27. The apparatus (21) of any one of the preceding claims wherein the apparatus (21) further comprises container storage means (56).
28. The apparatus (21) of claim 27 wherein the container storage means (56) is located distal from the assembly position (36).
- 20 29. The apparatus (21) of claim 27 and claim 28 wherein the container storage means (56) stores multiple containers (11) in a substantially vertical stack.
30. The apparatus (21) of any one of claims 27 to 29 wherein conveyor means are provided to convey a container (11) from the container storage

means (56) to the assembly position (36) such that the container (11) is positioned beneath an enclosure assembly (1) when the enclosure assembly (1) is in the expanded condition at the assembly position (36).

31. The apparatus (21) of any one of the preceding claims wherein
5 lifting means (61) are provided to lift the container (11) into engagement
with the expanded enclosure assembly (1) to enable the enclosure
assembly (1) to be mounted on the container (11).

32. The apparatus (21) of claim 31 wherein the lifting means (61)
comprises a pivotable arm (63) on which the container (11) rests, the
10 arm (63) being pivotable between a lowered position and a raised
position.

33. The apparatus (21) of claim 32 wherein the arm (63) is pivotable
using a hydraulic ram (67).

34. A method of assembling a collapsible enclosure assembly (1) of the
15 type comprising a plurality of collapsible walls (2, 3 4) and which is
adapted to be supported, when erected, on a container (11) so that, in
situ, the enclosure assembly (1) encloses a region above the
container (11), the method comprising moving a collapsed enclosure
assembly (1) from a storage position (25) to an assembly position (36),
20 moving the walls (2, 3, 4) of the enclosure assembly (1) relatively apart
to expand the collapsed enclosure assembly (1) when in the assembly
position (36) so that the enclosure assembly (1) is of generally tubular
form, and mounting the erected enclosure assembly (1) on a
corresponding container (11).

35. The method of claim 34 wherein the method comprises pulling at least one wall (2, 3, 4) of the collapsed enclosure assembly (1) away from the other walls (2, 3, 4).
36. The method of claim 33 wherein the enclosure assembly (1) comprises a first two opposed walls (2, 3) and a second two opposed walls (4), the method comprising moving the first two opposed walls (2, 3) relatively apart and then moving the second two opposed walls (4) apart.
37. The method of any one of claims 34 to 36 wherein the method comprises initially retaining a first wall of the enclosure assembly (1) and moving the retained enclosure assembly (1) to the assembly position (36).
38. The method of claim 37 wherein the method then comprises retaining an opposed wall of the enclosure assembly (1) and then pulling the opposed wall away from the first wall to expand the enclosure assembly (1).
39. The method of claim 37 or claim 38 further comprising conveying a container (11) from a container storage means (56) to the assembly position (36) and positioning the container (11) beneath the expanded enclosure assembly (1).
40. The method of claim 39 wherein the method comprises lifting the so positioned container (11) into engagement with the expanded enclosure assembly (1).